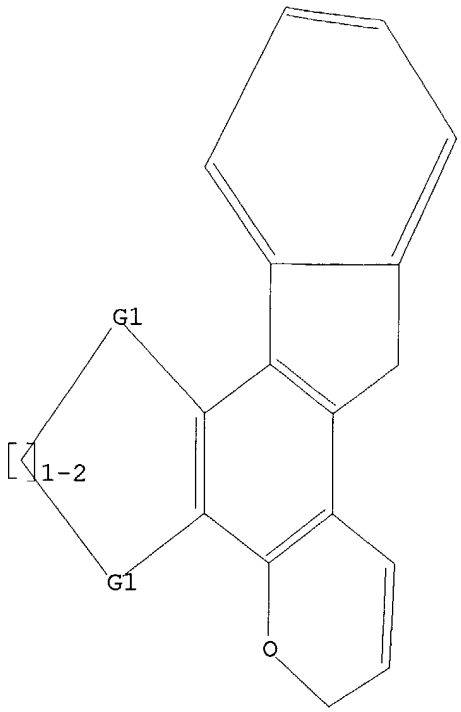
7/12/2004

L1 HAS NO ANSWERS
L1 STR



G1 C,O,S,N

s l2
L3 73 L2

=> s l3 and photochromic
9818 PHOTOCHROMIC
48 PHOTOCHROMICS
9824 PHOTOCHROMIC
(PHOTOCHROMIC OR PHOTOCHROMICS)
L4 48 L3 AND PHOTOCHROMIC

=> s l4 and chromene
1589 CHROMENE
769 CHROMENES
1861 CHROMENE
(CHROMENE OR CHROMENES)
L5 16 L4 AND CHROMENE

=> d l5 1-16 iall

L5 ANSWER 1 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2004:493798 CAPLUS
ENTRY DATE: Entered STN: 18 Jun 2004
TITLE: Coating composition and optical article
INVENTOR(S): Mori, Katsuhiro; Momoda, Junji
PATENT ASSIGNEE(S): Tokuyama Corporation, Japan
SOURCE: PCT Int. Appl., 100 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C09D004-00

SECONDARY: C09D007-12; C09K009-02; C08J007-04; G02B005-23; G02C007-10
CLASSIFICATION: 63-7 (Pharmaceuticals)
Section cross-reference(s): 38, 73
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004050775	A1	20040617	WO 2003-JP15558	20031204

W: AU, JP, US
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR

PRIORITY APPLN. INFO.: JP 2002-354291 A 20021205
JP 2002-372835 A 20021224

ABSTRACT:
Disclosed is a coating composition which, when applied to a substrate such as a plastic lens, can form on the substrate surface a **photochromic** coating layer having satisfactory photochromism and excellent adhesion to the substrate. The composition contains as monomer ingredients, for example, 0.1-20 % monomer having a group which generates a silanol group upon hydrolysis, such as γ-methacryloyloxypropyltrimethoxysilane and 0.1-50 % monomer having at least one oxycarbonyl group per mol. A maleimide compound may be further contained as other monomer ingredient. More desirably, the composition contains an amine compound A coating composition containing γ-methacryloyloxypropyltrimethoxysi
lane, trimethylolpropanetrimethacrylate, polyethylene glycol diacrylate, urethane oligomer hexaacrylate (U-6HA), glycidyl methacrylate, hydroxypivalic acid neopentylglycol diacrylate, N-methyldiehtanolamine, a polymerization initiator, a
stabilizer, and a **chromene** compound, was formulated, and applied on a thiourethane-based plastic lense.

SUPPL. TERM: **photochromic** coating material plastic lense

INDEX TERM: Plastics
ROLE: BUU (Biological use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); THU (Therapeutic use); BIOL (Biological study); PROC (Process); USES (Uses)
(allyl; **photochromic** coating composition for optical article)

INDEX TERM: **Photochromic** materials
(eyeglass lenses; **photochromic** coating composition for optical article)

INDEX TERM: Optical materials
(**photochromic** coating composition for optical article)

INDEX TERM: Acrylic polymers
Polyurethanes
ROLE: BUU (Biological use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); THU (Therapeutic use); BIOL (Biological study); PROC (Process); USES (Uses)
(**photochromic** coating composition for optical article)

INDEX TERM: Coating materials
Eyeglass lenses
(**photochromic**; **photochromic** coating composition for optical article)

INDEX TERM: Lenses
(plastic; **photochromic** coating composition for optical article)

INDEX TERM: Polyurethanes
ROLE: BUU (Biological use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); THU (Therapeutic use); BIOL (Biological study); PROC (Process); USES (Uses)
(thio-; **photochromic** coating composition for optical article)

INDEX TERM: Epoxy resins
ROLE: BUU (Biological use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); THU (Therapeutic use); BIOL (Biological study); PROC (Process); USES (Uses)
(thio; **photochromic** coating composition for optical article)

INDEX TERM: 705967-98-2P 705967-99-3P 705968-00-9P 705968-01-0P
705968-02-1P 705968-03-2P 705968-04-3P 705968-05-4P
705968-06-5P 705968-07-6P 705968-08-7P 705968-09-8P
705968-10-1P 705968-11-2P 705968-12-3P 705968-13-4P
705968-14-5P 705968-16-7P 705968-17-8P 705968-18-9P
705968-19-0P 705968-20-3P 705968-21-4P 705968-32-7P
ROLE: BUU (Biological use, unclassified); SPN (Synthetic preparation); TEM (Technical or engineered material use); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(**photochromic** coating composition for optical article)

INDEX TERM: **308283-12-7 308283-35-4** 312969-97-4
321861-35-2 356061-14-8 378235-36-0
682811-95-6 **682811-96-7**
ROLE: BUU (Biological use, unclassified); TEM (Technical or engineered material use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(**photochromic** coating composition for optical article)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD.

REFERENCE(S):
(1) Lintec Corp; JP 04-65481 A 1992 CAPLUS
(2) Lintec Corp; EP 467552 A1 1992 CAPLUS
(3) Tokuyama Corp; WO 01005854 A1 2001
(4) Tokuyama Corp; EP 1130038 A1 2001 CAPLUS
(5) Tokuyama Corp; WO 0228930 A1 2002
(6) Tokuyama Corp; EP 1293522 A1 2002 CAPLUS
(7) Tokuyama Corp; JP 2002105139 A 2002 CAPLUS
(8) Tokuyama Corp; WO 03011967 A1 2003 CAPLUS

L5 ANSWER 2 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2003:945459 CAPLUS
DOCUMENT NUMBER: 140:5601
ENTRY DATE: Entered STN: 04 Dec 2003
TITLE: Polymerizable compositions with good storage stability and their **photochromic** polymers
INVENTOR(S): Izumi, Shinobu; Mori, Chikahiro; Hyakuta, Junji
PATENT ASSIGNEE(S): Tokuyama Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C08F002-44
SECONDARY: C08F020-30; C08F290-06; G03C001-73
CLASSIFICATION: 37-3 (Plastics Manufacture and Processing)
Section cross-reference(s): 73, 74

FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003342310	A2	20031203	JP 2002-153597	20020528

PRIORITY APPLN. INFO.: JP 2002-153597 20020528
ABSTRACT:
Title compns. comprise (A) **photochromic** compds. and (B) radically polymerizable monomers (viscosity ≥60 cP at 25°) containing ≥45% monomers having aromatic groups. Thus, a composition containing 2,2-bis(4-methacryloyloxyethoxyphenyl)propane, glycidyl methacrylate, trimethylolpropane trimethacrylate, EB 1830 (polyester oligomer hexaacrylate), polyethylene glycol diacrylate, and a **photochromic** mol. compound of ***chromene*** derivative and toluene showed no deposition of the ***photochromic*** compound for 42 h at 40°. Then, the composition was applied on a plastic lens and irradiated with a metal halide lamp to give a test piece showing good **photochromic** property.

SUPPL. TERM: **photochromic** polymerizable compn storage stability; lens **photochromic** polymerizable coating storage stability

INDEX TERM: Polyoxyalkylenes, preparation
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylic-polyester-; polymerizable compns. with good storage stability for **photochromic** polymers)

INDEX TERM: Polyesters, preparation
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylic-polyoxyalkylene-; polymerizable compns. with good storage stability for **photochromic** polymers)

INDEX TERM: Polyoxyalkylenes, preparation
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylic; polymerizable compns. with good storage stability for **photochromic** polymers)

INDEX TERM: Lenses
Photochromic materials
(polymerizable compns. with good storage stability for **photochromic** polymers)

INDEX TERM: 628290-18-6P 628290-19-7P 628290-20-0P 628290-21-1P 628290-22-2P 628297-96-1P
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polymerizable compns. with good storage stability for **photochromic** polymers)

INDEX TERM: **628290-23-3** 628290-24-4
ROLE: TEM (Technical or engineered material use); USES (Uses)
(polymerizable compns. with good storage stability for **photochromic** polymers)

L5 ANSWER 3 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2003:931453 CAPLUS
DOCUMENT NUMBER: 139:401382
ENTRY DATE: Entered STN: 28 Nov 2003
TITLE: **Photochromic** composite containing aromatic **chromene**
INVENTOR(S): Nagoh, Hironobu; Momoda, Junji
PATENT ASSIGNEE(S): Tokuyama Corporation, Japan

SOURCE: PCT Int. Appl., 81 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C09K009-02
SECONDARY: C09D004-00; C09D201-00; C09D007-12; C08L101-00; C08K005-3432; C08K005-1545; C07D311-78; G02C007-10; G02B001-04
CLASSIFICATION: 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003097765	A1	20031127	WO 2002-JP4947	20020522

W: AU, JP, US
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR

PRIORITY APPLN. INFO.: WO 2002-JP4947 20020522
ABSTRACT:
The invention refers to a **photochromic** composite or coating comprising 0.01 - 20 unit wts. of a **chromene** compound and an aromatic compound in 100 unit wts. of a radical monomer or polymer.

SUPPL. TERM: **photochromic** material optical coating lens
chromene arom
INDEX TERM: Lenses
Optical films
Photochromic materials
(**photochromic** composite containing aromatic **chromene**)
INDEX TERM: 116958-66-8, NK Oligo U 6HA 146479-65-4, Ebecryl 1830 214746-73-3 **321861-35-2 356061-14-8 378235-33-7** 378235-36-0 521272-61-7 626244-04-0, Polyethylene glycol diacrylate-glycidyl methacrylate copolymer 626244-05-1, Polyethylene glycol diacrylate-glycidyl methacrylate-divinylbenzene copolymer 626244-06-2 626244-08-4 626244-10-8
ROLE: DEV (Device component use); USES (Uses)
(**photochromic** composite containing aromatic **chromene**)
INDEX TERM: **308283-35-4P** 312969-97-4P
ROLE: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(**photochromic** composite containing aromatic **chromene**)
INDEX TERM: 159596-05-1 194940-93-7 308283-44-5 312969-84-9
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(**photochromic** composite containing aromatic **chromene**)
REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD.
REFERENCE(S): (1) Tokuyama Corp; JP 200111066 A 2001
(2) Tokuyama Corp; JP 2001114775 A 2001 CAPLUS
(3) Tokuyama Corp; JP 2002161269 A 2002 CAPLUS

L5 ANSWER 4 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2003:349318 CAPLUS
DOCUMENT NUMBER: 138:370386
ENTRY DATE: Entered STN: 08 May 2003

TITLE: **Photochromic** photocurable coating materials with good storage stability and **photochromic** eyeglass lenses therefrom

INVENTOR(S): Hyakuta, Junji; Kuwahara, Eiko
PATENT ASSIGNEE(S): Tokuyama Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C08F002-44
SECONDARY: C08F002-48; C09D004-00; G02B001-10; G02B005-23; G02C007-10; C09D005-00
CLASSIFICATION: 42-10 (Coatings, Inks, and Related Products)
Section cross-reference(s): 63, 73
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003128713	A2	20030508	JP 2001-319944	20011017

PRIORITY APPLN. INFO.: JP 2001-319944 20011017

ABSTRACT:
The coating materials comprise (A) base precursors capable of releasing bases upon photo irradiation, (B) radically polymerizable monomers comprising epoxy-containing monomers, and (C) **photochromic** compds. Thus, a composition comprising 2,2-bis[4-(acryloyloxypolyethylene glycol)phenyl]propane, Ebecryl EB 1830 (polyester acrylate), glycidyl methacrylate, polyethylene glycol diacrylate, trimethylolpropane trimethacrylate, γ-methacryloyloxypropyl trimethoxysilane, a **chromene photochromic** dye, and PhCH2CO2N:CMePh, showing good storage stability, was applied on a plastic lens and photocured to give a coating showing maximum absorption wavelength 610 nm and good peel strength.

SUPPL. TERM: eyeglass lens **photochromic** coating acrylic polyoxyalkylene polyester; storage stable **photochromic** coating oxime base precursor; polyester acrylate glycidyl methacrylate coating **chromene photochromic** dye

INDEX TERM: Polyesters, uses
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylate-terminated, polymers with acrylic monomers; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)

INDEX TERM: Polyoxyalkylenes, uses
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylic-polyester-; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)

INDEX TERM: Polyesters, uses
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylic-polyoxyalkylene-; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)

INDEX TERM: Oximes
Urethanes
ROLE: CAT (Catalyst use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(base precursors; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)

INDEX TERM: **Photochromic** materials
(dyes; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)
INDEX TERM: **Photochromic** materials
(eyeglass lenses; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)
INDEX TERM: Coating materials
(**photochromic**, storage-stable; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)
INDEX TERM: Dyes
Eyeglass lenses
(**photochromic**; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)
INDEX TERM: Bases, uses
ROLE: CAT (Catalyst use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(precursors; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)
INDEX TERM: 30435-66-6 81014-63-3 101283-36-7 138570-07-7 168697-85-6 174504-21-3 521272-60-6
ROLE: CAT (Catalyst use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(base precursors; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)
INDEX TERM: **308283-14-9**
ROLE: TEM (Technical or engineered material use); USES (Uses)
(**photochromic** dyes; **photochromic** photocurable coatings with good storage stability for eyeglass lenses)
INDEX TERM: 521272-59-3P 521272-61-7P 521272-62-8P
ROLE: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**photochromic** photocurable coatings with good storage stability for eyeglass lenses)

L5 ANSWER 5 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2003:149740 CAPLUS
DOCUMENT NUMBER: 139:54273
ENTRY DATE: Entered STN: 27 Feb 2003
TITLE: Unusual UV (λexc = 303 nm) and visible (λexc = 574 nm) activated photochromism of an indeno-fused naphthopyran
AUTHOR(S): Favaro, Gianna; Ortica, Fausto; Romani, Aldo
CORPORATE SOURCE: Dipartimento di Chimica, Universita di Perugia, Perugia, 06123, Italy
SOURCE: New Journal of Chemistry (2003), 27(3), 639-643
CODEN: NJCHE5; ISSN: 1144-0546
PUBLISHER: Royal Society of Chemistry
DOCUMENT TYPE: Journal
LANGUAGE: English
CLASSIFICATION: 41-5 (Dyes, Organic Pigments, Fluorescent Brighteners, and Photographic Sensitizers)
Section cross-reference(s): 73

ABSTRACT:
In this work a completely novel **photochromic** mechanism exhibited by an indeno-fused naphthopyran (**chromene**) is presented. The studied mol. is the first case of a **chromene**-type compound exhibiting both photochromism and thermochromism. These phenomena were investigated in

ethanol. Thermochromism was detected by monitoring absorption spectra in the 285-320 K temperature range: the enthalpy of the thermocoloration reaction was determined
(ΔH = 25 kJ mol-1) and the equilibrium constant was estimated (Keq ≈ 10-3). For the photochem. investigation, carried out in the 200-270 K temperature range, continuous monochromatic light was used for excitation. The photocoloration was observed under two distinct stimulations: UV-irradiation (λexc = 303 nm), which is normally used for **photochromic chromene** activation, and visible-irradiation (λexc = 574 nm) of the thermally equilibrated solution Two colored species are involved in the photochem. and thermal processes. One of them, P, is photochem. produced by UV irradiation of the colorless form, while the other, T, is present in thermal equilibrium with the closed form. When the thermally equilibrated solution is irradiated with visible light, T is converted to P. This system not only results in a cyclic on-off chromogenic device which can be switched on by UV radiation, while also exhibiting on-off functionality using lower energy visible light. Such behavior makes this **photochromic** system exceptionally efficient upon exposure to sunlight.

SUPPL. TERM: indeno fused naphthopyran dye photochromism; **chromene** dye thermochromism photochromism UV visible light activated

INDEX TERM: Photochromism
(UV and visible light-activated photochromism of indeno-fused naphthopyran dye)

INDEX TERM: Fluorescence
UV and visible spectra
(in UV and visible light-activated photochromism of indeno-fused naphthopyran dye)

INDEX TERM: Thermochromism
(photochromism and thermochromism of indeno-fused naphthopyran dye)

INDEX TERM: **178990-12-0**
ROLE: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(dye; UV and visible light-activated photochromism of indeno-fused naphthopyran)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD.

REFERENCE(S):

(1) Favaro, G; J Chem Soc, Faraday Trans 1994, V90, P333 CAPLUS
(2) Favaro, G; Mol Cryst Liq Cryst 1997, V298, P137
(3) Favaro, G; Photochem Photobiol 2000, V72, P632 CAPLUS
(4) Favaro, G; Proc Indian Acad Sci 1995, V107, P659 CAPLUS
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(9) Ortica, F; Photochem Photobiol Sci 2002, V1, P803 CAPLUS
(10) Samat, A; Organic Photochromic and Thermochromic Compounds, ch 10 1999, V2
(11) van Gemert, B; Mol Cryst Liq Cryst 1997, V297, P131 CAPLUS
(12) van Gemert, B; Organic Photochromic and Thermochromic Compounds, ch 3 1999, V1

L5 ANSWER 6 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2002:758662 CAPLUS
DOCUMENT NUMBER: 138:138763
ENTRY DATE: Entered STN: 07 Oct 2002
TITLE: Effects of the environment on the **photochromic** behaviour of a novel indeno-fused naphthopyran

AUTHOR(S): Ortica, Fausto; Romani, Aldo; Blackburn, Forrest; Favaro, Gianna
CORPORATE SOURCE: Dipartimento di Chimica, Universita di Perugia, Perugia, 06123, Italy
SOURCE: Photochemical & Photobiological Sciences (2002), 1(10), 803-808
CODEN: PPSHCB; ISSN: 1474-905X
PUBLISHER: Royal Society of Chemistry
DOCUMENT TYPE: Journal
LANGUAGE: English
CLASSIFICATION: 41-11 (Dyes, Organic Pigments, Fluorescent Brighteners, and Photographic Sensitizers)
Section cross-reference(s): 27, 73

ABSTRACT:
The photochromism of 3,3-bis(4-methoxyphenyl)-6,11,13-trimethyl-3,13-dihydrobenzo[3,4]fluoreno[2,1-b]pyran-13-ol, a new **chromene**-type indeno-fused naphthopyran, was studied under steady irradiation in solvents of different polarity and/or proticity, in microheterogeneous systems (micelles and gel) and in a nematic liquid crystal. The solns. change from colorless to colored upon UV irradiation, due to cleavage of the carbon-oxygen pyran bond. The photoreaction is thermally reversible. Spectra, molar absorption coeffs. of the colorless and colored forms, quantum yield of photocoloration, and kinetic parameters of the thermal bleaching (rate constant and activation energy) were determined Compared with other **chromenes**, the spectra of both the colored and colorless forms are red-shifted and the colored form exhibits a marked pos. solvatochromism. The photocolorability is good, even at ambient temperature, and is better in a polar and/or protic medium where the entropy loss due to solvent reorganization around the transition state decreases the rate of the bleaching process. Thus, the best media for coloration are ethanol and E49 liquid crystals. In the gel and microemulsion the non-polar ground state mols. (in both the open and closed forms) occupy the hydrophobic sites and therefore the behavior is similar to that observed in isooctane.

SUPPL. TERM: photochromism indenonaphthopyran **chromene** dye surrounding medium effect
INDEX TERM: Photochromism
(effects of environment on **photochromic** behavior of indeno-fused naphthopyran dye)
INDEX TERM: Solvatochromism
Tautomerization kinetics
UV and visible spectra
(in effects of environment on **photochromic** behavior of indeno-fused naphthopyran dye)
INDEX TERM: Micelles
(**photochromic** behavior of indeno-fused naphthopyran dye in)
INDEX TERM: Gelatins, uses
ROLE: NUU (Other use, unclassified); USES (Uses)
(**photochromic** behavior of indeno-fused naphthopyran dye in)
INDEX TERM: Tautomers
(phototautomerism; in effects of environment on **photochromic** behavior of indeno-fused naphthopyran dye)
INDEX TERM: Tautomers
(ring-chain; in effects of environment on **photochromic** behavior of indeno-fused naphthopyran dye)
INDEX TERM: **178990-12-0**
ROLE: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(effects of environment on **photochromic**

behavior of indeno-fused naphthopyran dye)

INDEX TERM: 64-17-5, Ethanol, uses 540-84-1, Isooctane 40817-08-1, E49
ROLE: NUU (Other use, unclassified); USES (Uses)
(**photochromic** behavior of indeno-fused naphthopyran dye in)

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD.

REFERENCE(S):
(1) Becker, R; J Am Chem Soc 1999, V121, P2104 CAPLUS
(2) Becket, R; J Am Chem Soc 1966, V88, P5931
(3) Borderie, B; J Phys Chem 1992, V96, P2953 CAPLUS
(4) Favaro, G; J Chem Soc, Faraday Trans 1994, V90, P333 CAPLUS
(5) Favaro, G; J Photochem Photobiol A 1995, V87, P235 CAPLUS
(6) Favaro, G; J Photochem Photobiol, A 2001, V140/3, P229
(7) Favaro, G; Mol Cryst Liq Cryst 1997, V298, P137
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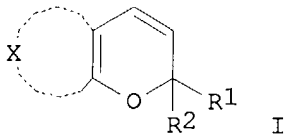
(10) Gauglitz, G; J Photochem Photobiol, A 1993, V71, P205 CAPLUS
(11) Ichimura, K; Photochromism. Molecules and systems 1990, P903 CAPLUS
(12) Kalyanasundaram, K; Photochemistry in Microheterogeneous Systems 1987
(13) Kolc, J; J Phys Chem 1967, V71, P4045 CAPLUS
(14) Lenoble, C; J Photochem 1986, V33, P187 CAPLUS
(15) Ortica, F; J Phys Chem B 2000, V104, P12179 CAPLUS
(16) Ottavi, G; Int J Chem Kinet 1999, V31, P303 CAPLUS
(17) Quellet, C; Chimia 1986, V40, P233 CAPLUS
(18) Quellet, C; J Phys Chem 1991, V95, P5642 CAPLUS
(19) Sun, X; Mol Cryst Liq Cryst 1997, V297, P57 CAPLUS
(20) Van Gemert, B; Organic Photochromic and Thermochromic Compounds 1998, V1

L5 ANSWER 7 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2002:423033 CAPLUS
DOCUMENT NUMBER: 137:13029
ENTRY DATE: Entered STN: 05 Jun 2002
TITLE: **Photochromic chromene** compounds, **photochromic** optical materials, their manufacture, and **photochromic** lenses
INVENTOR(S): Nago, Hironobu; Hyakuta, Junji
PATENT ASSIGNEE(S): Tokuyama Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 14 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C09K009-02
SECONDARY: G03C001-73
CLASSIFICATION: 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 27
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002161269	A2	20020604	JP 2000-360687	20001128

PRIORITY APPLN. INFO.: JP 2000-360687 20001128
OTHER SOURCE(S): MARPAT 137:13029

GRAPHIC IMAGE:



I

ABSTRACT:

Photochromic materials that are mol. compds. of **chromene** compds., e.g. I (R1-2 = (un)substituted aryl; R1 and/or R2 = (un)substituted amino-containing Ph; X = (un)substituted bivalent group forming condensed ring) and aromatic compds. (mol. weight 70-150) are claimed. The materials are manufactured by contact reaction of aromatic compds. (mol. weight 70-150) and I. ***Photochromic*** optical materials containing the materials, their preparation by hardening of polymerizable monomers containing the materials dissolved therein, and ***photochromic*** lenses comprising laminates of the optical materials are also claimed.

SUPPL. TERM: **photochromic** material **chromene** arom mol compd; lens **photochromic** mol compd photocurable polymer dispersed

INDEX TERM: Molecular association
Photochromic materials
(manufacture of highly soluble aromatic compound-**chromene** mol. compds. as **photochromic** materials for uses in plastic lenses)

INDEX TERM: Lenses
(**photochromic**; manufacture of highly soluble aromatic compound-**chromene** mol. compds. as **photochromic** materials for uses in plastic lenses)

INDEX TERM: 154951-58-3P, Glycidyl methacrylate-2-hydroxyethyl methacrylate-tetraethylene glycol dimethacrylate-triethylene glycol dimethacrylate copolymer
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manufacture of highly soluble aromatic compound-**chromene** mol. compds. as **photochromic** materials for uses in plastic lenses)

INDEX TERM: 159596-05-1 **308283-60-5** 313049-73-9 431948-60-6
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(manufacture of highly soluble aromatic compound-**chromene** mol. compds. as **photochromic** materials for uses in plastic lenses)

INDEX TERM: 108-88-3D, Toluene, compds.
ROLE: TEM (Technical or engineered material use); USES (Uses)
(mol. compound with **chromene** derivs.; manufacture of highly soluble aromatic compound-**chromene** mol. compds. as **photochromic** materials for uses in plastic lenses)

INDEX TERM: **308283-35-4P** 312969-97-4P
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(mol. compound with toluene; manufacture of highly soluble aromatic

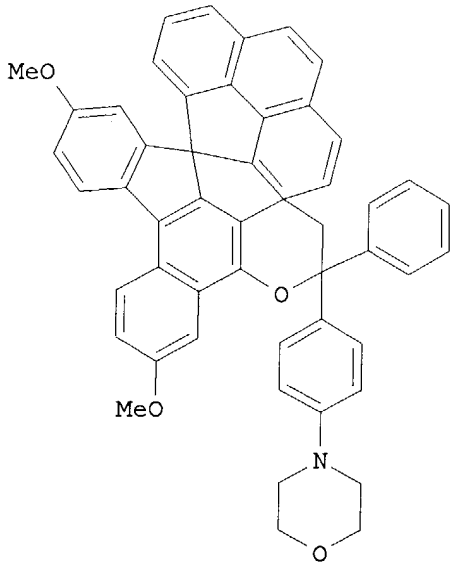
compound-**chromene** mol. compds. as **photochromic** materials for uses in plastic lenses)

L5 ANSWER 8 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2002:270670 CAPLUS
DOCUMENT NUMBER: 136:310847
ENTRY DATE: Entered STN: 11 Apr 2002
TITLE: Curable **photochromic** compositions with good releasability and hard coat adhesion
INVENTOR(S): Hyakuta, Junji; Otani, Toshiaki
PATENT ASSIGNEE(S): Tokuyama Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 20 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C08F236-22
SECONDARY: C08F002-44; C09K009-02
CLASSIFICATION: 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 73
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002105139	A2	20020410	JP 2000-299464	20000929
WO 2002028930	A1	20020411	WO 2001-JP7959	20010913
W: AU, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
AU 2001086229	A5	20020415	AU 2001-86229	20010913
EP 1293522	A1	20030319	EP 2001-965625	20010913
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				
US 2003036579	A1	20030220	US 2002-148319	20020529

PRIORITY APPLN. INFO.: JP 2000-299464 A 20000929
WO 2001-JP7959 W 20010913

GRAPHIC IMAGE:



I

ABSTRACT:
The compns. useful for eyeglass lens, etc., comprise (A) trimethylolpropane trimethacrylate-type monomers, (B) γ-methacryloylpropyltrimethoxysilane-type silyl monomers, (C) other radically polymerizable monomers, and (D) ***photochromic*** compds. 0.0001-10 parts (based on 100 parts monomers). Cast polymerization of trimethylolpropane trimethacrylate 20, γ-methacryloylpropyltrimethoxysilane 5, 2,2-bis(4-methacryloyloxyethoxyphenyl)propane 25, tetraethylene glycol dimethacrylate 30, polyethylene glycol diacrylate 3, glycidyl methacrylate 10, α-methylstyrene 6, α-methylstyrene dimer 1, **chromene** I 0.03 and Perbutyl ND 1 part in a glass cell gave a test piece showing λmax 610 nm, good durability, releasability, and hard coat adhesion.

SUPPL. TERM: **photochromic** molding releasability hard coat adhesion; trimethylolpropane trimethacrylate eyeglass lens **photochromic** compn; methacryloylpropyltrimethoxysilane eyeglass lens **photochromic** compn

INDEX TERM: Polyoxyalkylenes, uses
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(acrylic; curable **photochromic** compns. for eyeglass lens with good releasability and hard coat adhesion)

INDEX TERM: **Photochromic** materials
(curable **photochromic** compns. with good releasability and hard coat adhesion)

INDEX TERM: Lenses
(eyeglass; curable **photochromic** compns. with good releasability and hard coat adhesion)

INDEX TERM: 409361-25-7P 409361-26-8P 409361-27-9P 409361-28-0P 409361-29-1P 409361-31-5P
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(curable **photochromic** compns. for eyeglass lens with good releasability and hard coat adhesion)

INDEX TERM: **308830-08-2** 312969-97-4 **321861-35-2** **356061-14-8** 378235-36-0 **409361-33-7** **409361-34-8**
ROLE: MOA (Modifier or additive use); TEM (Technical or

engineered material use); USES (Uses)
(curable **photochromic** compns. for eyeglass lens with good releasability and hard coat adhesion)

L5 ANSWER 9 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2001:617991 CAPLUS
DOCUMENT NUMBER: 135:203059
ENTRY DATE: Entered STN: 24 Aug 2001
TITLE: **Photochromic chromene** compound
INVENTOR(S): Izumi, Shinobu; Kawabata, Yuichiro; Takeda, Yasuko; Momoda, Junji; Nagoh, Hironobu
PATENT ASSIGNEE(S): Tokuyama Corporation, Japan
SOURCE: PCT Int. Appl., 118 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C07D311-94
SECONDARY: C07D405-10; C07D409-04; C07D451-02; C07D453-02; C07D491-20; C07D491-107; C07D495-10; C09K009-02; G03C001-73; G02B001-04; G02B005-23
CLASSIFICATION: 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 27
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001060811	A1	20010823	WO 2000-JP9419	20001228
W: AU, JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
AU 2001022307	A5	20010827	AU 2001-22307	20001228
EP 1184379	A1	20020306	EP 2000-985992	20001228
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
US 2003096117	A1	20030522	US 2001-958843	20011015
US 6723859	B2	20040420		
US 2004014995	A1	20040122	US 2003-603686	20030626

PRIORITY APPLN. INFO.: JP 2000-42682 A 20000221
WO 2000-JP9419 W 20001228
US 2001-958843 A3 20011015
OTHER SOURCE(S): MARPAT 135:203059
ABSTRACT:
A novel **chromene** compound having various substituents which, even when dispersed in a polymer matrix, is highly sensitive in color development to attain a high color d. and has a high fading rate, and which colors little upon deterioration and has excellent **photochromic** durability; a ***photochromic*** material containing the **chromene** compound; and other applications of the **chromene** compound

SUPPL. TERM: **photochromic chromene** compd
INDEX TERM: **Photochromic** materials
(**photochromic chromene** compound)
INDEX TERM: **317817-61-1P 317817-65-5P**
356060-93-0P 356060-94-1P
356060-95-2P 356060-96-3P
356060-97-4P 356060-98-5P
356060-99-6P 356061-00-2P
356061-01-3P 356061-02-4P
356061-03-5P 356061-04-6P

356061-05-7P 356061-06-8P 356061-07-9P
356061-08-0P 356061-09-1P
356061-10-4P 356061-11-5P
356061-12-6P 356061-13-7P
356061-14-8P 356061-15-9P
356061-16-0P 356061-17-1P
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356061-20-6P 356061-21-7P
356061-22-8P 356061-23-9P
356061-24-0P 356061-25-1P
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356061-56-8P 356061-57-9P
356061-58-0P 356061-59-1P
356061-60-4P 356061-61-5P
356061-62-6P 356061-63-7P
356061-64-8P 356061-65-9P 356061-66-0
P 356061-67-1P 356061-68-2P
356061-69-3P 356061-70-6P
356061-71-7P 356061-72-8P
356061-73-9P 356061-74-0P
ROLE: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(**photochromic chromene** compound)

INDEX TERM:
71228-44-9 101597-25-5 118965-01-8 194940-93-7
214746-70-0 263026-73-9 263026-74-0 308283-51-4
317817-59-7 317817-64-4 356060-92-9 356061-75-1
356061-76-2 356061-77-3 356061-78-4 356061-79-5
356061-80-8 356061-81-9 356061-82-0 356061-83-1
356061-84-2 356061-85-3 356061-86-4 356061-87-5
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356062-41-4 356062-42-5 356062-43-6 356062-44-7
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(**photochromic chromene** compound)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD.

REFERENCE(S):
(1) Optische, W; JP 2000034418 A CAPLUS

(2) Optische, W; EP 987260 A1 CAPLUS
(3) Optische, W; DE 19902771 A1 1999 CAPLUS
(4) Optische, W; WO 012384 A1 2001
(5) Tokuyama Corporation; WO 0071544 A1 2000 CAPLUS
(6) Tokuyama Corporation; EP 1054010 A1 2000 CAPLUS
(7) Tokuyama Corporation; JP 2000344762 A 2000 CAPLUS
(8) Tokuyama Corporation; JP 200111066 A 2001

L5 ANSWER 10 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2001:290840 CAPLUS
DOCUMENT NUMBER: 134:303097
ENTRY DATE: Entered STN: 25 Apr 2001
TITLE: **Photochromic chromene** compounds exhibiting low initial coloring and optical materials therewith
INVENTOR(S): Nago, Hironobu; Momota, Junji
PATENT ASSIGNEE(S): Tokuyama Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 19 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C07D311-92
SECONDARY: C07D311-94; C09K009-02; G02B005-23; G03C001-73
CLASSIFICATION: 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 27, 38, 73
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001114775	A2	20010424	JP 1999-296614	19991019

PRIORITY APPLN. INFO.: JP 1999-296614 19991019
OTHER SOURCE(S): MARPAT 134:303097
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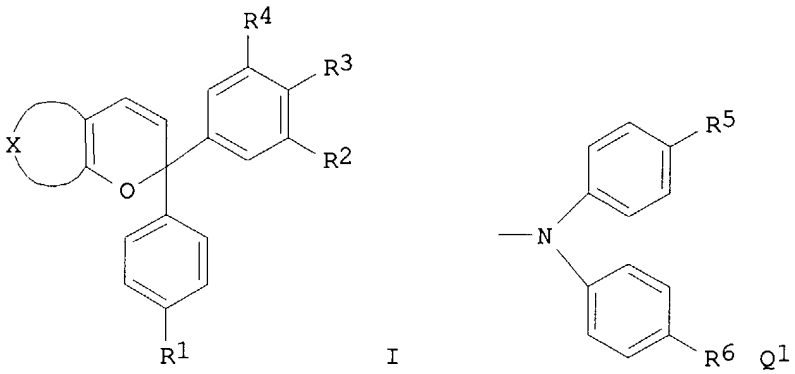

ABSTRACT:
The compds., useful for eyeglasses, have skeletons of I [R1 = Q1 (R5, R6 = H, CF3, cyano, etc.), NR7R8 (R7, R8 = H, alkyl, CF3, cyano, etc.); R2-4 = H, alkoxy, halo, CF3, trifluoromethoxy; X = bivalent condensed polycycles].

SUPPL. TERM: **photochromic chromene** initial coloring low eyeglass; hydroxymorpholinonaphthalene propargyl alc reacted **photochromic chromene**

INDEX TERM: **Photochromic** materials
(**photochromic chromene** compds. exhibiting low initial coloring for **photochromic** optical materials)

INDEX TERM: Eyeglasses
(**photochromic**; **photochromic chromene** compds. exhibiting low initial coloring for **photochromic** optical materials)

INDEX TERM: 159596-05-1P
ROLE: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(in preparation of **chromene** compds. exhibiting good **photochromic** property with low initial coloring)

INDEX TERM: 110-91-8, Morpholine, reactions 135-19-3, 2-Naphthol, reactions 484-17-3, 9-Phenanthrenol 7782-50-5, Chlorine, reactions 51936-79-9 159596-01-7 308283-41-2 308283-44-5 334829-91-3 334829-92-4 334829-93-5 334829-94-6 334829-95-7 334829-96-8 334829-97-9 334829-98-0 334829-99-1
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(in preparation of **chromene** compds. exhibiting good **photochromic** property with low initial coloring)

INDEX TERM: 334829-80-0P 334829-82-2P 334829-84-4P 334829-85-5P 334829-86-6P 334829-87-7P 334829-88-8P **334829-89-9P 334829-90-2P**
ROLE: PNU (Preparation, unclassified); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**photochromic chromene** compds. exhibiting low initial coloring for **photochromic** optical materials)

INDEX TERM: 154951-58-3P, Glycidyl methacrylate-2-hydroxyethyl methacrylate-tetraethylene glycol dimethacrylate-triethylene glycol dimethacrylate copolymer
ROLE: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**photochromic chromene** compds. exhibiting low initial coloring for **photochromic** optical materials)

L5 ANSWER 11 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2001:40100 CAPLUS
DOCUMENT NUMBER: 134:93390
ENTRY DATE: Entered STN: 17 Jan 2001
TITLE: **Photochromic chromene** compound
INVENTOR(S): Kawabata, Yuichiro; Momota, Junji
PATENT ASSIGNEE(S): Tokuyama Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C07D311-92
SECONDARY: C07D491-107; C07D493-10; C09K009-02
CLASSIFICATION: 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 27
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

JP 2001011066 A2 20010116 JP 1999-188902 19990702
PRIORITY APPLN. INFO.: JP 1999-188902 19990702
OTHER SOURCE(S): MARPAT 134:93390
ABSTRACT:
The **photochromic chromene** compound has the main structure of an indene ring having a specific substituent on the 1-position. The ***chromene*** compound shows the rapid discoloring speed and little residual color even after repeated coloring and discoloring.

SUPPL. TERM: **photochromic chromene** compd indene
INDEX TERM: **Photochromic** materials
(**photochromic chromene** compound)
INDEX TERM: **317817-52-0P 317817-54-2P** 317817-56-4P
317817-58-6P 317817-61-1P 317817-63-3P
317817-65-5P 317817-67-7P
317817-69-9P 317817-71-3P
317817-73-5P
ROLE: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**photochromic chromene** compound)
INDEX TERM: 118965-01-8 194940-93-7 214746-69-7 317817-51-9
317817-53-1 317817-55-3 317817-57-5 317817-59-7
317817-60-0 317817-62-2 317817-64-4 317817-66-6
317817-68-8 317817-70-2 317817-72-4
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(**photochromic chromene** compound)

L5 ANSWER 12 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2001:38489 CAPLUS
DOCUMENT NUMBER: 134:108075
ENTRY DATE: Entered STN: 16 Jan 2001
TITLE: **Photochromic chromene** compound
INVENTOR(S): Momota, Junji; Komuro, Yasuko
PATENT ASSIGNEE(S): Tokuyama Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 18 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C07D311-94
SECONDARY: C09K009-02
CLASSIFICATION: 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 27
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001011067	A2	20010116	JP 1999-188146	19990701

PRIORITY APPLN. INFO.: JP 1999-188146 19990701
ABSTRACT:
The **photochromic chromene** compound has the main structure of an indene ring which has an alkynyl group on the 1-position. The ***chromene*** compound shows the good color concentration, the rapid discoloring speed, and little coloring even after long service-time.

SUPPL. TERM: **photochromic chromene** compd indene
INDEX TERM: **Photochromic** materials
(**photochromic chromene** compound)
INDEX TERM: **308830-06-0P 308830-10-6P**

308830-14-0P 308830-42-4P
318487-87-5P 318487-88-6P
318487-92-2P 318487-94-4P
318487-96-6P 318487-99-9P
ROLE: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**photochromic chromene** compound)

INDEX TERM: 1066-26-8, Sodium acetylide 71228-44-9 78250-21-2
80826-37-5 118965-01-8 194940-93-7 255377-08-3
308283-51-4 **318487-84-2** 318487-86-4
318487-90-0
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(**photochromic chromene** compound)

INDEX TERM: **308283-58-1P 308283-60-5P**
313049-36-4P 313049-41-1P
318487-89-7P 318487-91-1P
318487-93-3P 318487-95-5P
318487-97-7P 318487-98-8P
ROLE: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(**photochromic chromene** compound)

L5 ANSWER 13 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2000:866427 CAPLUS
DOCUMENT NUMBER: 134:49256
ENTRY DATE: Entered STN: 12 Dec 2000
TITLE: New **chromene** compound for **photochromic** material
INVENTOR(S): Kawabata, Yuichiro; Momota, Junji
PATENT ASSIGNEE(S): Tokuyama Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 22 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C07D311-94
SECONDARY: C07D493-04; C07D493-10; C07D495-10; C07D495-20; C09K009-02
CLASSIFICATION: 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 27, 42, 73
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000344762	A2	20001212	JP 1999-154272	19990601

PRIORITY APPLN. INFO.: JP 1999-154272 19990601
OTHER SOURCE(S): MARPAT 134:49256
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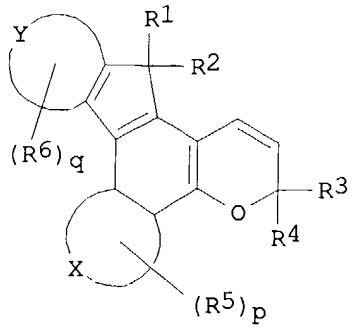


I

ABSTRACT:
The new **chromene** compound is represented by a general formula I (X, Y = atoms for forming aromatic hydrocarbon or unsatd. heterocycle; R1, R2 = fused ring, H, OH, alkyl, etc.; R3, R4 = aryl, heteroaryl, etc.; R5 = OH, alkyl, etc.; R6 = OH, alkyl, etc.; p = 0-3; q = 0-3). The **chromene** compound shows excellent **photochromic** properties.

SUPPL. TERM: **chromene** compd prepn **photochromic** material

INDEX TERM: Coating materials
Lenses
Photoimaging materials
(**photochromic**; new **chromene** compound for **photochromic** material)

INDEX TERM: **Photochromic** materials
(photoimaging; new **chromene** compound for **photochromic** material)

INDEX TERM: **313049-39-7P 313049-40-0P**
313049-43-3P 313049-47-7P
313049-50-2P 313049-52-4P
313049-55-7P 313049-57-9P 313049-60-4P
313049-62-6P **313049-65-9P 313049-67-1P**
313049-69-3P 313049-71-7P 313049-74-0P
ROLE: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(preparation of **chromene** compound for **photochromic** material)

INDEX TERM: 13390-92-6 82214-69-5 **308283-54-7**
308283-58-1 312730-49-7 **313049-36-4**
313049-37-5 **313049-41-1** 313049-42-2
313049-44-4 313049-46-6 **313049-48-8**
313049-49-9 313049-51-3 **313049-53-5**
313049-54-6 313049-56-8 313049-58-0 313049-61-5
313049-63-7 313049-64-8 **313049-66-0**
313049-68-2 313049-72-8 313049-73-9
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(preparation of **chromene** compound for **photochromic** material)

INDEX TERM: **313049-38-6P**
ROLE: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation of **chromene** compound for **photochromic** material)

L5 ANSWER 14 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2000:842135 CAPLUS
DOCUMENT NUMBER: 134:17504
ENTRY DATE: Entered STN: 01 Dec 2000

TITLE: Preparation of **chromene** compounds as **photochromic** substances
INVENTOR(S): Momoda, Junji; Komuro, Yasuko
PATENT ASSIGNEE(S): Tokuyama Corporation, Japan
SOURCE: PCT Int. Appl., 79 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C07D493-10
SECONDARY: G03C001-73
CLASSIFICATION: 28-17 (Heterocyclic Compounds (More Than One Hetero Atom))
Section cross-reference(s): 35, 74
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000071544	A1	20001130	WO 2000-JP3200	20000518
W: AU, JP, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1116723	A1	20010718	EP 2000-929795	20000518
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
US 6469076	B1	20021022	US 2001-744305	20010430

PRIORITY APPLN. INFO.: JP 1999-144072 A 19990524
WO 2000-JP3200 W 20000518
OTHER SOURCE(S): MARPAT 134:17504
GRAPHIC IMAGE:

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *

ABSTRACT:
Photochromic compds., developing colors of neutral tints by themselves and exhibiting high fading speeds and excellent durability of photochromism, are prepared The compds. are novel **chromene** compds. having a basic structure which is constituted of an indene ring bearing in a state bonded to the 1-position through a spiro union a fused ring composed of a pyran ring and a specific divalent group bonded to the 5- and 6-position carbon atoms of the pyran ring, a fused ring composed of a **chromene** ring and a specific divalent group bonded to the 5- and 6-position carbon atoms of the ***chromene*** ring, and a specific substituent bonded to the 2-position carbon atom of the **chromene** ring, for example, the compound represented by structural formula [I; ring A, ring B = bivalent aromatic hydrocarbon or unsatd. heterocyclic group; R1, R2, R3, R4 = alkyl HO, alkoxy, aralkoxy, (un)substituted NH2, cyano, NO2, (un)substituted aryl, halo, CF3, aralkyl, (un)substituted heterocyclyl optionally fused to aromatic hydrocarbon or heterocyclic ring; p, q, m, n = 0-3; R5, R6 = (CR8:CH)rR7, (C.tplbond.C)mR9; R7, R9 = (un)substituted aryl, heteroaryl; R8 = H, alkyl, halo; n = 1-3]. A ***photochromic*** optical material, **photochromic** material, and ***photochromic*** polymerizable composition containing I are also claimed. Thus, ***chromene*** derivative (II) and 2-naphthol were dissolved in toluene and stirred with p-toluenesulfonic acid at room temperature for 1 h to give 33% title compound (III). Nonaethylene glycol dimethacrylate-triethylene glycol dimethacrylate-glycidyl methacrylate-2-hydroxyethyl methacrylate copolymer containing III exhibited gray coloration with initial coloration ε of 0.03, fading speed of 2.2 min, and excellent durability of photochromism at

λmax of 465 nm.

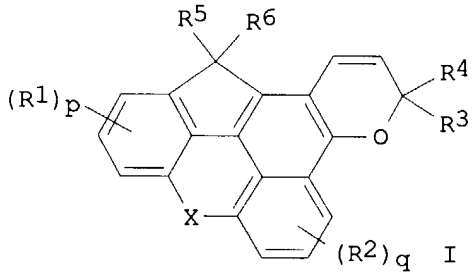
SUPPL. TERM: **chromene** prepn **photochromic** substance
INDEX TERM: Acrylic polymers, preparation
ROLE: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(containing **chromene** derivs.; preparation of **chromene** compds. as **photochromic** substances)
INDEX TERM: **Photochromic** materials
(preparation of **chromene** compds. as **photochromic** substances)
INDEX TERM: 308283-39-8P, Nonaethylene glycol dimethacrylate-triethylene glycol dimethacrylate-glycidyl methacrylate-2-hydroxyethyl methacrylate copolymer
ROLE: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(containing **chromene** derivs.; preparation of **chromene** compds. as **photochromic** substances)
INDEX TERM: **308830-08-2P 308830-12-8P**
308830-16-2P 308830-18-4P
308830-23-1P 308830-27-5P
308830-31-1P 308830-33-3P
308830-35-5P 308830-37-7P
308830-40-2P 308830-44-6P
308830-48-0P
ROLE: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(preparation of **chromene** compds. as **photochromic** substances)
INDEX TERM: 90-15-3, 1-Naphthol 135-19-3, 2-Naphthol, reactions 484-17-3, 9-Phenanthrenol 5111-66-0, 6-Methoxy-2-naphthol 19393-87-4, 8-Methyl-2-naphthol 30069-65-9, 3-Phenyl-1-naphthol 57985-68-9, 3-tert-Butyl-1-naphthol 70227-82-6 159596-05-1, 4-Morpholino-2-naphthol
308830-06-0 308830-10-6
308830-14-0 308830-21-9
308830-25-3 308830-28-6
308830-42-4 308830-46-8
308831-07-4
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(preparation of **chromene** compds. as **photochromic** substances)
REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD.
REFERENCE(S): (1) Optische, W; JP 200034418 A
(2) Optische, W; JP 200034418 A
(3) Optische, W; EP 987260 A1 CAPLUS
(4) Optische, W; EP 987260 A1 CAPLUS
(5) Optische, W; DE 19902771 A1 1999 CAPLUS
(6) Optische, W; DE 19902771 A1 1999 CAPLUS

L5 ANSWER 15 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2000:830139 CAPLUS
DOCUMENT NUMBER: 134:23564
ENTRY DATE: Entered STN: 28 Nov 2000
TITLE: **Photochromic chromene** compound
INVENTOR(S): Matsuoka, Shingo; Momota, Junji

PATENT ASSIGNEE(S): Tokuyama Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 18 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: C07D311-94
SECONDARY: C09K009-02; G03C001-73
CLASSIFICATION: 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000327676	A2	20001128	JP 1999-144074	19990524

PRIORITY APPLN. INFO.: JP 1999-144074 19990524
OTHER SOURCE(S): MARPAT 134:23564
GRAPHIC IMAGE:



I

ABSTRACT:
The **photochromic chromene** compound is represented by general formula I [R1, R2 = H, alkyl, alkoxy, aralkoxy, amino, cyano, aryl, halo, aralkyl, fused heterocycle; p, q = 0-3; R3, R4 = -(C(R8):CH)nR7, -(C.tplbond.C)mR9, aryl, heteroaryl, alkyl; R3 joining together with R4 may form aliphatic or aromatic hydrocarbon ring; R5, R6 = H, alkyl, cycloalkyl, aryl acyl, cyano, halo, etc.; X = O, S, ethylidene, etc.; R7 = aryl, heteroaryl; R8 = H, alkyl, halo; n = 1-3; R9 = aryl, heteroaryl; m = 1-3]. The ***photochromic*** **chromene** compound dispersed in a polymer matrix can be used as an **photochromic** optical imaging element. The ***photochromic*** **chromene** compound shows excellent ***photochromic*** properties.

SUPPL. TERM: **photochromic chromene** prepn optical imaging material
INDEX TERM: Coating materials
Lenses
Photoimaging materials
(**photochromic**; preparation of **photochromic chromene** compound suitable for)
INDEX TERM: **Photochromic** materials
(photoimaging; preparation of **photochromic chromene** compound suitable for)
INDEX TERM: **Photochromic** materials
(preparation of **photochromic chromene** compound)
INDEX TERM: 154951-58-3, Glycidyl methacrylate-2-hydroxyethyl methacrylate-tetraethyleneglycol dimethacrylate-

triethyleneglycol dimethacrylate copolymer
ROLE: NUU (Other use, unclassified); USES (Uses)
(**chromene photochromic** compound
dispersed in matrix of)

INDEX TERM: 100-58-3 703-55-9 82214-69-5, Magnesium, [1,1'-biphenyl]-2-ylbromo- 102164-16-9 194940-93-7 309261-08-3 309261-10-7 309261-14-1 309261-16-3 **309261-20-9**
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(preparation of **photochromic chromene** compound)

INDEX TERM: **309261-11-8P**
ROLE: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation of **photochromic chromene** compound)

INDEX TERM: **309261-09-4P 309261-12-9P 309261-13-0P 309261-15-2P 309261-17-4P 309261-18-5P 309261-19-6P 309261-21-0P 309261-22-1P 309261-23-2P**
ROLE: SPN (Synthetic preparation); PREP (Preparation)
(preparation of **photochromic chromene** compound)

L5 ANSWER 16 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2000:822708 CAPLUS
DOCUMENT NUMBER: 134:5911
ENTRY DATE: Entered STN: 24 Nov 2000
TITLE: **Photochromic chromene** spiro derivatives and polymerizable compositions containing them
INVENTOR(S): Momoda, Junji; Kawabata, Yuichiro
PATENT ASSIGNEE(S): Tokuyama Corporation, Japan
SOURCE: Eur. Pat. Appl., 45 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
INT. PATENT CLASSIF.:
MAIN: C07D311-96
SECONDARY: C07D493-10; C08K005-15; G02B005-23
CLASSIFICATION: 41-11 (Dyes, Organic Pigments, Fluorescent Brighteners, and Photographic Sensitizers)
Section cross-reference(s): 37, 63
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1054010	A1	20001122	EP 2000-304240	20000519
EP 1054010	B1	20020724		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2001192378	A2	20010717	JP 2000-142655	20000516
JP 3522189	B2	20040426		
US 6340765	B1	20020122	US 2000-572896	20000518
ES 2179005	T3	20030116	ES 2000-304240	20000519
AU 765599	B2	20030925	AU 2000-35402	20000519

PRIORITY APPLN. INFO.: JP 1999-140836 A 19990520
JP 1999-303967 A 19991026
OTHER SOURCE(S): MARPAT 134:5911
ABSTRACT:

Photochromic compds. having high color-developing sensitivity, large fading rate, and good durability of **photochromic** property are characterized by a structure in which a condensed ring having a particular divalent group bonded to carbon atoms at the fourth and fifth positions of a fluoreno group is spiro-bonded to the first position of an indene ring, a particular divalent group is bonded to carbon atoms at the fifth and sixth positions of a **chromene** ring to form a condensed ring, and particular substituents are bonded to a carbon atom at the second position of the ***chromene*** ring. Such **photochromic** dyes may be incorporated into a polymer matrix for the production of **photochromic** lenses. Examples of production of 18 **photochromic** dyes were given.

SUPPL. TERM: **photochromic chromene** spiro deriv dye prodn

INDEX TERM: **Photochromic** materials
(dyes; production of **photochromic chromene** spiro derivs. and polymerizable compns. containing them)

INDEX TERM: Dyes
(**photochromic**; production of **photochromic chromene** spiro derivs. and polymerizable compns. containing them)

INDEX TERM: Lenses
(**photochromic**; production of **photochromic chromene** spiro derivs. for)

INDEX TERM: **308283-10-5P 308283-12-7P**
308283-14-9P 308283-16-1P
308283-18-3P 308283-20-7P
308283-22-9P 308283-24-1P
308283-26-3P 308283-28-5P
308283-30-9P 308283-32-1P
308283-33-2P 308283-34-3P
308283-35-4P 308283-36-5P
308283-37-6P 308283-38-7P
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(dye; production of **photochromic chromene** spiro derivs. and polymerizable compns. containing them)

INDEX TERM: 308283-39-8P, Glycidyl methacrylate-2-hydroxyethyl methacrylate-nonaethylene glycol dimethacrylate-triethylene glycol dimethacrylate copolymer 308283-40-1P, Glycidyl methacrylate-2-hydroxyethyl methacrylate-nonaethylene glycol dimethacrylate-tetraethylene glycol dimethacrylate-triethylene glycol dimethacrylate copolymer
ROLE: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(matrix for **photochromic chromene** spiro derivative dyes)

INDEX TERM: 19462-79-4 50548-45-3 118965-01-8 194940-93-7
214746-69-7 255377-08-3 308283-41-2 308283-42-3
308283-43-4 308283-44-5 308283-45-6 308283-46-7
308283-51-4 **308283-53-6 308283-54-7**
308283-55-8 308283-56-9 308283-57-0
308283-58-1 308283-59-2 **308283-60-5**
308283-61-6 308283-62-7
308283-63-8
ROLE: RCT (Reactant); RACT (Reactant or reagent)
(starting material; production of **photochromic chromene** spiro derivs.)

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD.

REFERENCE(S):
(1) Ppg Industries; WO 9614596 A 1996 CAPLUS
(2) Rodenstock; DE 19902771 A 1999 CAPLUS

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